

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-9 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The crystal grows smoothly from the outer edge towards the central portion ,(Page 33, lines 11-14 ) is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). In figure 7 and page 33,lines 11-14 it discloses that the crystal grows smoothly from the outer edge portion towards the central portion but does not teach slit image formation of laser onto the semiconductor but for further purpose of examination “the semiconductor layer will be formed into a slit image using laser beam” will be used .

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-4 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura Nobu (JP 09-092839) in view of Kim et al.(US 2004/0106241).

Re. claim 1, Okumura teaches a method of manufacturing a crystallized semiconductor device comprises the steps of:

(i) forming a amorphous silicon film(9)(same as semiconductor layer) on a insulating substrate(same as substrate)(1)(Para[0029],line 1-2);

(ii) Irradiating the amorphous silicon film(9)(same as semiconductor layer) with laser light so as to crystallize the amorphous silicon film(9)(same as semiconductor layer).

(iii) forming a translucency film(3)(same as thermal diffusion layer)(3) on a surface of the amorphous silicon film(9)(same as semiconductor layer)(Para[0030]). It is apparent to have the thermal conductivity of the translucency film higher than that of the substrate (For example if the translucency film is silicon nitride than the thermal conductivity is 30.1 and for substrate such as glass it is 1.1).

in the step (ii), the amorphous silicon film(9)(same as semiconductor layer) being irradiated with the laser light from above the translucency film(3)(same as thermal diffusion layer)(3) (Para[0031]).

Okumura does not teach the semiconductor layer will be formed into a slit image using laser beam.

However, Kim et al. teaches the semiconductor layer will be formed into a slit image using laser beam (Figure 2D) for adjusting the distribution of the grain boundaries.

Therefore it would have been obvious for one with ordinary skill in the art at the time the invention was made to provide Okumura structure with the semiconductor layer being

formed into a slit image using laser beam for adjusting the distribution of the grain boundaries.

Re. claim 2 as discussed above in claim 1, Okumura and Kim et al. disclose all the limitations as discussed above in claim 1 including the step of eliminating the translucency film(3)(same as thermal diffusion layer)(3) after the step(ii)(Para[0032] ,line 1-2, Okumura).

Re. claim 3 as discussed above in claim 2, Okumura and Kim et al. disclose all the limitations as discussed above in claim 2 including having the laser light irradiating in the translucency film (same as thermal diffusion layer)(3) without absorption which makes it apparent to have the translucency film (same as thermal diffusion layer)(3) optical absorptivity lower with respect to the laser light than the amorphous silicon film(9)(same as semiconductor layer) where the light is absorbed, which makes it apparent to have the amorphous silicon film(9)(same as semiconductor layer) with higher optical absorptivity.

Re. claim 4 as discussed above in claim 1, Okumura and Kim et al. disclose all the limitations as discussed above in claim 1 including having laser light having a wavelength of 308nm(which is less than 550 nm) is used in the step(ii)(Okumura).

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Re. claim 7 as discussed above in claim 1, Okumura and Kim et al. disclose all the limitations as discussed above in claim 1 including having a silicon dioxide layer between the substrate(1) and the amorphous silicon film(9)(same as semiconductor layer)(Para[0029],line 1-2, Okumura)). It is apparent to have the thermal conductivity layer of silicon dioxide, which is a layer between the substrate and amorphous silicon film(9)(same as semiconductor layer) and has a lower thermal conductivity than the thermal conductivity of the substrate(For example if the layer between the substrate and semiconductor layer is silicon dioxide, it has a thermal conductivity of 0.59 and is lower than the thermal conductivity of glass which is 1.1).

Re. claim 8 as discussed above in claim 1, Okumura and Kim et al. disclose all the limitations as discussed above in claim 1 including having the translucency film (same as thermal diffusion layer)(3) made of silicon nitride(Para[0053],line 1-3, Okumura) which makes it inherent to have the optical transmittance of the translucency film (same as thermal diffusion layer)(3) with respect to the laser light is 70% or more.

Re. claim 9 as discussed above in claim 1, Okumura and Kim et al. disclose all the limitations as discussed above in claim 1 including having the translucency film (same as thermal diffusion layer)(3) made of silicon nitride as an alternative to the instant invention(Para[0053],line 1-3).

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1. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura Nobu (JP 09-092839) in view of Kim et al.(US 2004/0106241) as applied to claim 4 and further in view of Yamazaki(US PUB 2007/0020826).

Re. claim 5 as discussed above in claim 4, Okumura Nobu (JP 09-092839) and Kim et al. disclose all the limitations as discussed above in claim 1 and 4 except having the laser light within the wavelength of 350nm or more.

However, Yamazaki discloses having the laser light having the wavelength of 400nm to 700nm(same as 350nm or more)(Para[0033],line 1-2).

It would have been obvious for one with ordinary skill in the art at the time the invention was made to modify Okumura Nobu (JP 09-092839) and Kim et al. in view of Yamazaki(US PUB 2007/0020826) to have the laser light with wavelength of 350nm or more to crystallize the amorphous semiconductor film(Para[0032],line 12).

Re. claim 6 as discussed above in claim 5, Okumura Nobu (JP 09-092839) and Kim et al. disclose all the limitations as discussed above in claim 1 and 4 except having the laser light being visible light.

However, Yamazaki discloses having the laser light being visible light(Para[0014],line 1-4).

It would have been obvious for one with ordinary skill in the art at the time the invention was made to modify Okumura Nobu (JP 09-092839) and Kim et al. in view of Yamazaki(US PUB 2007/0020826) to have the laser light being visible light to make it applicable from a view point of absorption coefficient of the semiconductor when a semiconductor film formed on a substrate or a semiconductor region separately formed is heated selectively(Para[0014],line 4-7).

#### **Response to Applicant's Argument**

In response to Applicant's argument, the examiner is moot in view of new grounds of rejection.

#### ***Conclusion***

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ankush k. Singal whose telephone number is 5712701204. The examiner can normally be reached on monday-friday 7am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MATTHEW SMITH can be reached on (571)272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michelle Estrada/  
Primary Examiner, Art Unit 2823

Ankush Singal



